

## What Is Claimed Is:

1. A dynamic image compression coding apparatus  
that performs quantization processing and coding  
5 processing to a dynamic image signal, wherein the  
quantization processing is split into two steps of first  
quantization that performs division using a quantization  
matrix and second quantization that performs division using  
a quantization scale and, a code amount is controlled by  
controlling the quantization scale.

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2. A dynamic image compression coding apparatus  
that performs quantization processing and coding  
processing to a dynamic image signal, wherein the  
quantization processing is split into two steps of first  
quantization that performs division using a quantization  
matrix and second quantization that performs division using  
a quantization scale, a storage means that stores a signal  
after the first quantization between the first quantization  
and the second quantization is provided, and a code amount  
is controlled by repeating the second quantization multiple  
times.

3. A dynamic image compression coding apparatus,

comprising:

a first quantization means that divides a dynamic image signal using a predetermined quantization matrix;

a storage means that stores an output signal of the first quantization means;

5 a second quantization means that divides an output signal of the storage means using a quantization scale;

a coding means that encodes the output signal of the second quantization means; and

10 a quantization control means that variably controls the quantization scale of the second quantization means based on a code amount of the output signal of the coding means.

4. The dynamic image compression coding apparatus according to claim 3, wherein the second quantization means and the coding means operate a plurality of times, and

the quantization control means variably controls the quantization scale of the second quantization means based on the code amount of the output signal of the coding means at each time.

20 5. The dynamic image compression coding apparatus according to claim 3, wherein the storage means outputs the output signal of the first quantization means twice,

25 the second quantization means divides the first

output signal of the storage means by a first quantization scale and divide the second output signal of the storage means by a second quantization scale,

the coding means encodes the output signal of the second quantization means, and

the quantization control means variably controls the second quantization scale of the second quantization means based on the code amount of the signal that is divided by the first quantization scale by the second quantization means and encoded by the coding means.

6. The dynamic image compression encoding apparatus according to claim 3, wherein

the storage means outputs the output signal of the first quantization means twice,

in the first time,

the second quantization means divides a one-picture output signal of the storage means every macro block using the quantization scale,

the coding means encodes a one-picture output signal of the second quantization means every macro block, and

the quantization control means calculates a target code amount every macro block based on the code amount for every macro block of the output signal of the coding means,

and

in the second time,  
the second quantization means divides the output  
signal of the storage means for every macro block using  
the quantization scale,

5 the coding means encodes the output signal of the  
second quantization means every macro block, and

the quantization control means compares the code  
amount for every macro block of the output signal of the  
coding means with the target code amount for every the macro  
block and supply the quantization scale used by the second  
quantization means in the second time to the second  
quantization means.

7. A dynamic image compression coding apparatus,  
comprising:

a first quantization means that divides a dynamic  
image signal that is split into a plurality of macro blocks  
using a predetermined quantization matrix;

a storage means that stores a one-picture output  
20 signal of the first quantization means;

a second quantization means that divides an output  
signal of the storage means by a first quantization scale  
for each of the plurality of macro blocks;

25 a quantization control means that controls the  
quantization scale of the second quantization means;

a coding means that encodes the output signal of the second quantization means; and

a target code amount decision means that decides a target code amount for each of the plurality of macro blocks that are supplied to the quantization control means based on a code amount for each of the plurality of macro blocks of the output signal of the coding means, wherein

the second quantization means divides the output signal of the storage means for each of the plurality of macro blocks by the second quantization scale;

the coding means encodes the output signal of the second coding means; and

the quantization control means compares the code amount for each of the plurality of macro blocks of the output signal of the coding means with the target code amount for each of the plurality of macro blocks supplied by the target code amount decision means and control the second quantization scale of the second quantization means based on the comparison result.

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8. A dynamic image compression coding apparatus, comprising:

a first quantization means that divides a one-picture dynamic image signal split into n pieces (n: optional positive integer) of macro blocks using a predetermined

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quantization matrix;

a storage means that stores a one-picture output signal of the first quantization means;

a second quantization means that divides an output signal of the storage means using a quantization scale;

a quantization control means that controls the quantization scale of the second quantization means;

a coding means that encodes an output signal of the second quantization means; and

10 a target code amount decision means that decides a target code amount for each of the macro blocks from a code amount of the output signal of the coding means, wherein

the storage means outputs the output signal of the first quantization means twice;

15 in the first time,

the second quantization means divides a first one-picture output signal of the storage unit for each of the macro blocks using a first quantization scale;

the coding means encodes a signal divided using the first quantization scale every the macro block; and

20 the target code amount decision means decides the target code amount for each of the macro blocks based on a total of the code amount for each of the macro blocks of the signal in which the signal divided using the first quantization scale is encoded and the one-picture code

amount; and

in the second time,

the second quantization means divides the k-th (k: positive integer of  $k < n$ ) macro block signal output from the storage means using a second quantization scale;

the coding means encodes the k-th macro block signal divided using the second quantization scale; and

the quantization control means compares the code amount of the signal in which the k-th macro block signal divided using the second quantization scale is encoded with the target code amount of the k-th macro block and variably control the second quantization scale used by the second quantization means for the division of the  $(k + 1)$ -th macro block signal based on the comparison result.

9. A dynamic image compression coding method,

comprising the steps of:

performing first quantization that divides a dynamic image signal using a predetermined quantization matrix;

storing a signal divided in the step of performing the first quantization;

performing second quantization that divides, using a quantization scale, the signal divided in the step of the first quantization or a signal stored in the step of performing the storage;

encoding the signal divided in the step of performing the second quantization; and

variably controlling the quantization scale used in the step of performing the second quantization based 5 on the code amount encoded in the step of encoding.

10. A dynamic image compression coding method in a dynamic image compression coding apparatus that comprises a first quantization means, a storage means, a second quantization means, a quantization control means, and a coding means, comprising the steps of:

allowing the first quantization means to divide a one-picture dynamic image signal split into  $n$  pieces ( $n$ : optional positive integer) of macro blocks using a predetermined quantization matrix;

allowing the storage means to store a one-picture output signal of the first quantization means;

allowing the second quantization means to divide, using a first quantization scale, a one-picture signal 20 output from the storage means for each of the macro blocks;

allowing the coding means to encode a signal divided using the first quantization scale for each of the macro blocks;

allowing the quantization control means to decide 25 a target code amount for each of the macro blocks based

on a total of a code amount every the macro block of a signal in which the signal divided using the first quantization scale is encoded and the one-picture code amount;

allowing the second quantization means to divide the k-th (k: positive integer of  $k < n$ ) macro block signal output from the storage means using a second quantization scale;

allowing the coding means to encode the k-th macro block signal divided using the second quantization scale; and

allowing the quantization control means to compare the code amount of the signal in which the k-th macro block signal divided using the second quantization scale is encoded with the target code amount of the k-th macro block and variably control the second quantization scale used by the second quantization means for the division of the  $(k+1)$ -th macro block signal based on the comparison result.

11. A dynamic image compression coding method in a computer having a storage means and an operation means, comprising the steps of:

allowing the operation means to perform first quantization that divides a dynamic image signal using a predetermined quantization matrix;

allowing the storage means to store a signal divided

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in the step of performing the first quantization;

allowing the operation means to perform, using a quantization scale, second quantization that divides the signal divided in the step of performing the first quantization or a signal stored in the step of performing the storage;

allowing the operation means to encode the signal divided in the step of performing the second quantization; and

allowing the operation means to variably control the quantization scale used in the step of performing the second quantization based on a code amount of the signal encoded in the step of performing the coding.

12. A computer program product stored on a computer readable medium for compressing and coding a dynamic image signal, said computer program product comprising:

code for a first quantization procedure that makes the operation means divide a dynamic image signal using a predetermined quantization matrix;

code for a storage procedure that makes the storage means store a signal divided in the first quantization procedure;

code for a second quantization procedure that, using a quantization scale, makes the operation means divide the

signal divided in the first quantization procedure or a signal stored in the storage procedure;

code for a coding procedure that encodes a signal divided in the second quantization procedure; and

5 code for a quantization control procedure that variably controls the quantization scale used in the second quantization procedure based on a code amount of the signal coded in the coding procedure.

10 13. A dynamic image compression coding apparatus, comprising:

a first quantization means that divides a dynamic image signal using a predetermined quantization matrix;

15 a storage means that stores an output signal of the first quantization means;

a plurality of estimation-system second quantization means that divide an output signal of the storage means using a plurality of different estimation-system quantization scales;

20 a plurality of estimation-system coding means that encode the output signal of the plurality of estimation-system second quantization means;

a second quantization means that divides the output signal of the storage means using a quantization scale;

25 a coding means that encodes the output signal of

the second quantization means; and

a quantization control means that variably controls the quantization scale based on a code amount of the output signal of the plurality of estimation-system coding means.

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14. The dynamic image compression encoding apparatus according to claim 13, wherein the plurality of different estimation-system quantization scales are the power of 2 respectively, and the plurality of estimation-system second quantization means operate division that, using a bit shift, uses the plurality of different estimation-system quantization scales.

15. The dynamic image compression coding apparatus according to claim 13, wherein the plurality of estimation-system second quantization means round down a residue among the results from which the division is performed using the plurality of different estimation-system quantization scale.

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16. A dynamic image compression coding recorder, comprising:

a first A/D converter to which an analog image signal is input and A/D-converts the input analog image signal;

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a motion compensation means that performs motion

compensation to an output signal of the first A/D converter;

a DTC conversion means that DTC-converts an output signal of the motion compensation means;

5 a first quantization means that divides an output signal of the DCT conversion means using a predetermined quantization matrix;

a storage means that stores an output signal of the first quantization means;

10 a second quantization means that divides the output signal of the storage means using a quantization scale;

a coding means that encodes an output signal of the second quantization means;

15 a quantization control means that variably controls the quantization scale of the second quantization means based on a code amount of the output signal of the coding means;

a second A/D converter to which an analog voice signal is input and A/D-converts the input analog voice signal;

20 and encode an output signal of the second A/D converter;

a multiplexing means that multiplexes the output signal of the coding means and the output signal of the voice compression coding means; and

25 a recording means that records a signal multiplexed by the multiplexing means.